No. 8500010

# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

## Rohm and Haas Seeds Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

**Secretary of Agriculture**

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

*SOYBEAN*

*'RA-405'*

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington *this* 30th *day of* August *in the year of our Lord one thousand nine hundred and* eighty-five.

*Attest:*

*Kenneth A. Evans*

*Commissioner*
*Plant Variety Protection Office*
*Agricultural Marketing Service*

*John R. Block*

*Secretary of Agriculture*

APPROVAL EXPIRES 4-30-85

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

FORM APPROVED: OMB NO. 0581-0055

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

# APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

*(Instructions on reverse)*

1. NAME OF APPLICANT(S) ROHM AND HAAS SEEDS INC. ~~Ring Around Products, Inc. by William H. Davis, Ph.D.~~

2. TEMPORARY DESIGNATION: RAX-54

3. VARIETY NAME: RA-405

4. ADDRESS *(Street and No. or R.F.D. No., City, State, and Zip Code)*: ~~Ring Around Research Center P.O. Box 1017 Hale Center, Tx. 79041~~

5. PHONE *(Include area code)*: ~~(806) 296-6161~~

FOR OFFICIAL USE ONLY

PVPO NUMBER: 8500010

6. GENUS AND SPECIES NAME: Glycine max

7. FAMILY NAME *(Botanical)*: Leguminosae

FILING — DATE: 10/10/84 — TIME: 2:30 ☐ A.M. ☒ P.M.

8. KIND NAME: Soybeans

9. DATE OF DETERMINATION: December 1983

FEES RECEIVED — AMOUNT FOR FILING: $ 1,800 — DATE: 10/10/84

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*: ~~Ring Around Products, Inc. 12200 Ford Rd., Suite 410, Dallas, Tx. 75234~~

FEES RECEIVED — AMOUNT FOR CERTIFICATE: $ ~~200.00~~ — DATE: 8/12/85

11. IF INCORPORATED, GIVE STATE OF INCORPORATION: Delaware

12. DATE OF INCORPORATION:

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS: ~~William H. Davis, Ph.D., Sr. Soybean Breeder Ring Around Research Center P.O. Box 1017 Hale Center, Tx. 79041~~ DR. JAMES E. STROIKE INDEPENDENCE MALL WEST PHILADELPHIA, PA. 19105

PHONE *(Include area code)*:

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED

R/S
- a. ☒ Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*
- b. ☒ Exhibit B, Novelty Statement.
- c. ☒ Exhibit C, Objective Description of Variety *(Request form from Plant Variety Protection Office.)*
- d. ☒ Exhibit D, Additional Description of Variety.
- e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act.)* ☐ Yes *(If "Yes," answer items 16 and 17 below)* ☒ No

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? ☐ Yes ☒ No

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? ☐ Foundation ☐ Registered ☐ Certified

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.? ☐ Yes *(If "Yes," give date)* ☒ No

19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES? ☐ Yes *(If "Yes," give names of countries and dates)* ☒ No

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT: William H Davis — DATE: 4 March 1985

SIGNATURE OF APPLICANT: — DATE:

FORM WA-470 (7-84) (Edition of 3-84 is obsolete.)

Exhibit A - Origin and Breeding History of the Variety

An $F_1$ cross SX-327 was made in the greenhouse in 1975. The parentage of this cross is as follows:

$$\text{SB 128(b)4} \times \frac{(\text{N70·1501} \times \text{Dare 72·8867A})\ F_3}{\text{SB 117(a)1}\ F_1} \times \frac{\text{Mitchell}}{\text{Columbus}}\ F_1$$

SB 128(b)4 was a single plant obtained from Missouri having high race 3, race 4 cyst nematode resistance.

SB 117(a)1 was a single plant selected from the variety Clark by Dr. Doug Owens at the Halfway Research Station, Halfway, Texas.

The $F_3$ bulk line was grown on bottom land east of Henderson, Kentucky in 1978. A single plant selection, SX-327(f)4K was identified as potential variety. It weighed 77 grams. This seed was tested in Preliminary Trial # 37, 1979 at Plainview, TX. This 20' row weighed 1710 grams at harvest compared to the check variety Mitchell 450 at 1620 grams.

Further testing and increase followed in 1980, 81, 82. A breeders seed block of this variety labeled RAX-54 was in 1982 at Fisher, Arkansas. Following yield trials and testing across locations in 1983, a decision was made to release RAX-54 as RA-405 by the Ring Around Soybean Research Committee.

Breeders and Foundation seed were prepared in 1983 for release of RA-405 in 1984.

RA-405 will have an occasional variant type plant in the population. These are:

| | | |
|---|---|---|
| Tan pods | = | 1/10,000 |
| Black Hilum | = | 1/5,000 |
| White flowers | = | 1/5,000 |

RA-405 will be recommeded for sale in areas of Central and Southern Missouri, Northern Kentucky, Southern Illinois and Indiana, High Plains of West Texas and parts of Northern Arkansas.

Exhibit B - Novelty Statement

RA-405 most nearly resembles the variety Mitchell in Phenotype. It differs from Mitchell in these traits

1) RA-405 has brown pods - Mitchell has tan pods.

FORM APPROVED: OMB NO. 0581-005

EXHIBIT (Soybea

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, MEAT, GRAIN & SEED DIVISION
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MARYLAND 20705

# OBJECTIVE DESCRIPTION OF VARIETY
*SOYBEAN (Glycine max L.)*

| NAME OF APPLICANT(S) | TEMPORARY DESIGNATION | VARIETY NAME |
|---|---|---|
| Ring Around Products, Inc.<br>William H. Davis | RAX-54 | RA-405 |

ADDRESS (Street and No., or R.F.D. No., City, State, and Zip Code)
Ring Around Research Center
P.O. Box 1017
Hale Center, TX. 79041

FOR OFFICIAL USE ONLY
PVPO NUMBER
8500010

Choose the appropriate response which characterizes the variety in the features described below. When the number of significant digits in your answer is fewer than the number of boxes provided, place a zero in the first box when number is 9 or less (e.g., [0][9]).

**1. SEED SHAPE:**

[2]


1 = Spherical (L/W, L/T, and T/W ratios = < 1.2)
2 = Spherical Flattened (L/W ratio > 1.2; L/T ratio = < 1.2)
3 = Elongate (L/T ratio > 1.2; T/W = < 1.2)
4 = Elongate Flattened (L/T ratio > 1.2; T/W > 1.2)

**2. SEED COAT COLOR: (Mature Seed)**

[1] 1 = Yellow 2 = Green 3 = Brown 4 = Black 5 = Other *(Specify)* _____

**3. SEED COAT LUSTER: (Mature Hand Shelled Seed)**

[1] 2 RFS
1 = Dull ('Corsoy 79'; 'Braxton') 2 = Shiny ('Nebsoy'; 'Gasoy 17')

**4. SEED SIZE: (Mature Seed)**

[1][5]. Grams per 100 seeds

**5. HILUM COLOR: (Mature Seed)**

[3] 1 = Buff 2 = Yellow 3 = Brown 4 = Gray 5 = Imperfect Black 6 = Black 7 = Other *(Specify)* _____

**6. COTYLEDON COLOR: (Mature Seed)**

[1] 1 = Yellow 2 = Green

**7. SEED PROTEIN PEROXIDASE ACTIVITY:**

[ ] 1 = Low 2 = High

**8. SEED PROTEIN ELECTROPHORETIC BAND:**

[ ] 1 = Type A ($SP1^a$) 2 = Type B ($SP1^b$)

**9. HYPOCOTYL COLOR:**

[3] 1 = Green only ('Evans'; 'Davis') 2 = Green with bronze band below cotyledons ('Woodworth'; 'Tracy')
3 = Light Purple below cotyledons ('Beeson'; 'Pickett 71')
4 = Dark Purple extending to unifoliate leaves ('Hodgson'; 'Coker Hampton 266A')

**10. LEAFLET SHAPE:**

[3] 1 = Lanceolate 2 = Oval 3 = Ovate 4 = Other *(Specify)* _____

8500010

11. LEAFLET SIZE:

[2] 1 = Small ('Amsoy 71'; 'A5312') 2 = Medium ('Corsoy 79'; 'Gasoy 17') 3 = Large ('Crawford'; 'Tracy')

12. LEAF COLOR:

[2] 1 = Light Green ('Weber'; 'York') 2 = Medium Green ('Corsoy 79'; 'Braxton') 3 = Dark Green ('Gnome'; 'Tracy')

13. FLOWER COLOR:

[2] 1 = White 2 = Purple 3 = White with purple throat

14. POD COLOR:

[2] 1 = Tan 2 = Brown 3 = Black

15. PLANT PUBESCENCE COLOR:

[2] 1 = Gray 2 = Brown (Tawny)

16. PLANT TYPES:

[2] 1 = Slender ('Essex'; 'Amsoy 71') 2 = Intermediate ('Amcor'; 'Braxton') 3 = Busny ('Gnome'; 'Govan')

17. PLANT HABIT:

[3] 1 = Determinate ('Gnome'; 'Braxton') 2 = Semi-Determinate ('Will') 3 = Indeterminate ('Nebsoy'; 'Improved Pelican')

18. MATURITY GROUP:

[7] 1 = 000 2 = 00 3 = 0 4 = I 5 = II 6 = III 7 = IV 8 = V 9 = VI 10 = VII 11 = VIII 12 = IX 13 = X

19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

BACTERIAL DISEASES:

[0] Bacterial Pustule (*Xanthomonas phaseoli* var. *sojensis*)

[0] Bacterial Blight (*Pseudomonas glycinea*)

[0] Wildfire (*Pseudomonas tabaci*)

FUNGAL DISEASES:

[0] Brown Spot (*Septoria glycines*)

Frogeye Leaf Spot (*Cercospora sojina*)

[0] Race 1 [ ] Race 2 [ ] Race 3 [ ] Race 4 [ ] Race 5 [ ] Other (*Specify*) _____

[0] Target Spot (*Corynespora cassiicola*)

[0] Downy Mildew (*Peronospora trifoliorum* var. *manshurica*)

[0] Powdery Mildew (*Microsphaera diffusa*)

[0] Brown Stem Rot (*Cephalosporium gregatum*)

[0] Stem Canker (*Diaporthe phaseolorum* var. *caulivora*)

19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant) (Continued)

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FUNGAL DISEASES: (Continued)

[0] Pod and Stem Blight *(Diaporthe phaseolorum var; sojae)*

[0] Purple Seed Stain *(Cercospora kikuchii)*

[0] Rhizoctonia Root Rot *(Rhizoctonia solani)*

Phytophthora Rot *(Phytophthora megasperma var. sojae)*

[0] Race 1 [0] Race 2 [0] Race 3 [0] Race 4 [0] Race 5 [0] Race 6 [0] Race 7

[0] Race 8 [0] Race 9 [0] Other *(Specify)* _____

VIRAL DISEASES:

[0] Bud Blight (Tobacco Ringspot Virus)

[0] Yellow Mosaic (Bean Yellow Mosaic Virus)

[0] Cowpea Mosaic (Cowpea Chlorotic Virus)

[0] Pod Mottle (Bean Pod Mottle Virus)

[0] Seed Mottle (Soybean Mosaic Virus)

NEMATODE DISEASES:

Soybean Cyst Nematode *(Heterodera glycines)*

[0] Race 1 [0] Race 2 [1] Race 3 [1] Race 4 [0] Other *(Specify)* _____

[0] Lance Nematode *(Hoplolaimus Columbus)*

[0] Southern Root Knot Nematode *(Meloidogyne incognita)*

[0] Northern Root Knot Nematode *(Meloidogyne Hapla)*

[0] Peanut Root Knot Nematode *(Meloidogyne arenaria)*

[0] Reniform Nematode *(Rotylenchulus reniformis)*

[0] OTHER DISEASE NOT ON FORM *(Specify)*: _____

20. PHYSIOLOGICAL RESPONSES: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

[*] Iron Chlorosis on Calcareous Soil

[ ] Other *(Specify)* intermediate _____

21. INSECT REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

[0] Mexican Bean Beetle *(Epilachna varivestis)*

[0] Potato Leaf Hopper *(Empoasca fabae)*

[0] Other *(Specify)* _____

22. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED.

| CHARACTER | NAME OF VARIETY | CHARACTER | NAME OF VARIETY |
|---|---|---|---|
| Plant Shape | Columbus | Seed Coat Luster | Mitchell |
| Leaf Shape | Columbus | Seed Size | Mitchell |
| Leaf Color | Columbus | Seed Shape | MItchell |
| Leaf Size | Columbus | Seedling Pigmentation | Mitchell |
| | | | |

23. GIVE DATA FOR SUBMITTED AND SIMILAR STANDARD VARIETY: Paired Comparison Data

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| VARIETY | NO. OF DAYS MATURITY | PLANT LODGING SCORE | CM PLANT HEIGHT | LEAFLET SIZE | | SEED CONTENT | | SEED SIZE G/100 SEEDS | NO. SEEDS/ POD |
|---|---|---|---|---|---|---|---|---|---|
| | | | | CM Width | CM Length | % Protein | % Oil | | |
| RA-405 Submitted | 145 | 1.8 | 142 | - | - | - | - | 16 | 2.0 |
| Mitchell Name of Similar Variety | 140 | 1.8 | 142 | - | - | - | - | 16 | 2.8 |

PUBLICATIONS USEFUL AS REFERENCE AIDS FOR COMPLETING THIS FORM:


1. Caldwell, B.E., ed. 1973. Soybeans: Improvement, Production, and Uses. Amer. Soc. Agron. Monograph No. 16.

2. Buttery, B.R. and R.I. Buzzell. 1968. Peroxidase activity in seeds of soybean varieties. Crop Sci., 8: 722-725.

3. Hymowitz, T. 1973. Electrophoretic analysis of SBTI-$A_2$ in the USDA soybean germplasm collection. Crop Sci., 13: 420-421.

4. Payne, R.C. and L.F. Morris. 1976. Differentiation of soybean cultivars by seedling pigmentation patterns. J. Seed Technol. 1: 1-12.


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Exhibit D - Additional Description of the Variety

RA-405 has purple flowers, brown pods and brown pubesence. The plant height is intermediate. It is a compact indeterminate variety with good side branching. Emergence of the seed is good. The variety has some limited tolerance to cyst nematodes.

The seed is somewhat intermediate in seed coat luster not truly dull or shiny. The seed coat is tight and of good quality. The hilum is brown and medium in length and width.

Its maturity is in the late IV group, approximately 5 days later than Mitchell. The plant color at maturity is chocolate brown.

Shattering is minimal if harvest is delayed.

RA-405 will be available as Registered and Certified seed in 1984-1985.

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EXHIBIT "E"

Statement of the Basis of Applicant's Ownership

RA-405

The applicant is the developer of RA-405. All rights to ownership are vested in Rohm & Haas, Independence Mall West, Philadelphia, Pa. 19105